Ashwin Poduval

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ABOUT

I am interested in improving the performance, power-efficiency and environmental impact of memory systems. My first PhD project involved developing a memory performance profiler. I am presently working on better understanding and improving tiered memory systems. I am also assisting with a project that aims to reduce data movement in database applications via hardware-software codesign.

EDUCATION

University of Wisconsin - Madison *Sep '21 - Present*
MS, PhD Computer Sciences
Courses: Adv. Computer Architecture I, Special Topics in Persistent Memory, Advanced ML Systems, Advanced Operating Systems, Distributed Systems, Intro to AI

Birla Institute of Technology and Science, Pilani *Aug '16 - July '20*
B.E. Electrical and Electronics Engineering

EXPERIENCE

University of Wisconsin - Madison Aug '21 - Present

- Surveyed a wide range of CXL and disaggregated memory management strategies. Working on testing and comparing application behavior across different systems. Work currently under submission.
- Evaluation of hardware-software codesign technique for data-movement reduction
- Target-independent memory performance analysis framework with <10% overhead (preprint available)
- Development of basic block profiler using LLVM compiler infrastructure
- Evaluation and optimization of instrumentation with graph and SPEC workloads
- LLVM MIR pass development and optimization
- Modifications to LLVM frontend and code generation (helped port XRay to RISC-V)

AMD Research May 2022 - September 2022

- Identifying memory bandwidth bottlenecks encountered when running HPC workloads
- Identifying memory system bottlenecks in MI300 series processors

Indian Institute of Science, Bangalore Dec '20 - July '21

- Performance analysis of reinforcement learning and computer vision drone workloads
- Power and energy consumption studies on Jetson TX2 platform
- Analysis of persistent memory workloads

Nvidia Corporation, Bangalore Jan - Jun '20

- ASIC Engineering Intern in a team which is part of the GPU Memory Subsytem
- Verified protocol changes pertaining to Nvidia's NVLink Interconnect

TECHNICAL SKILLS

Performance Analysis Tools	perf, Pin, LLVM XRay, cProfile, nvprof, PyTorch Profiler
Programming Languages	C++, Python, Bash, R
Other	Proficient in developing & debugging LLVM IR and MIR passes, 6+ months of experience in gem5 simulation